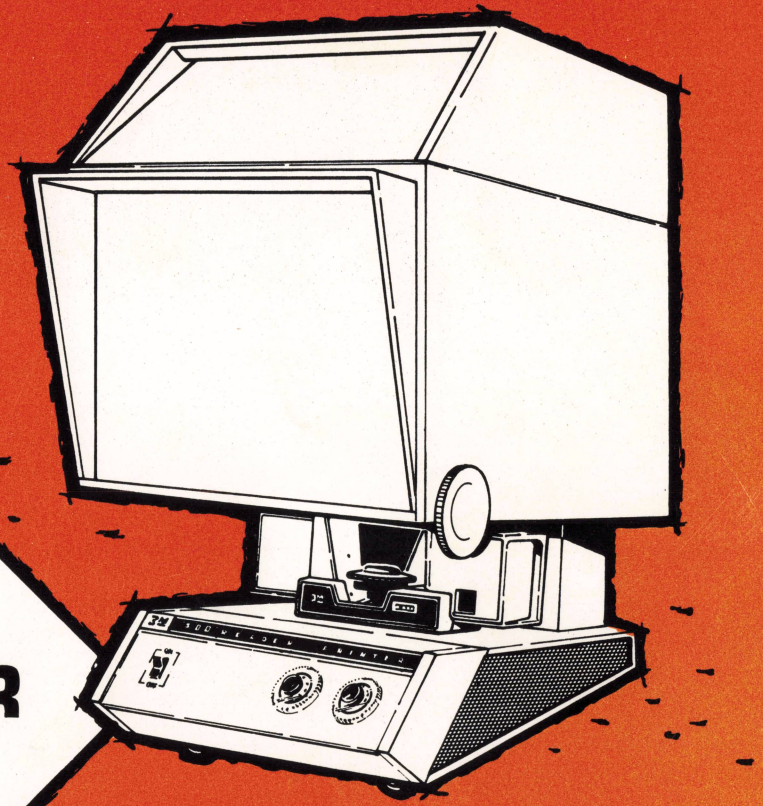
3M BRAND

"500" READER-PRINTER

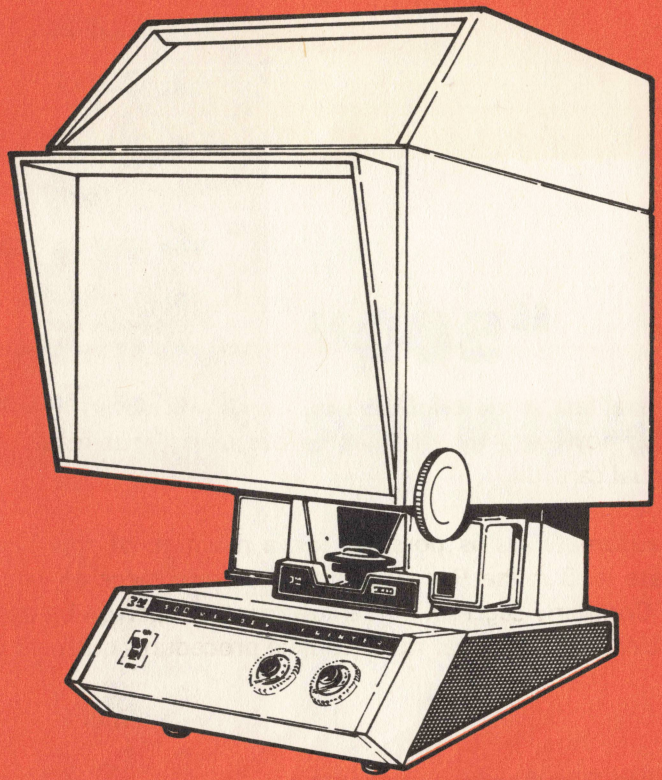


OPERATOR'S GUIDE

"500" READER-PRINTER

3M Microfilm Products Division
MINNESOTA MINING & MANUFACTURING CO.

operator's manual contents



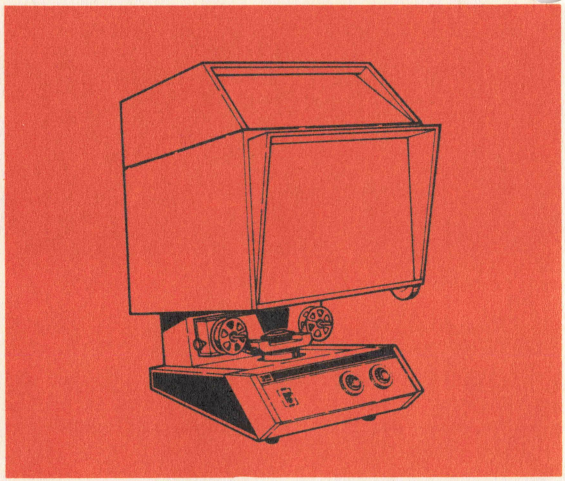
take a break

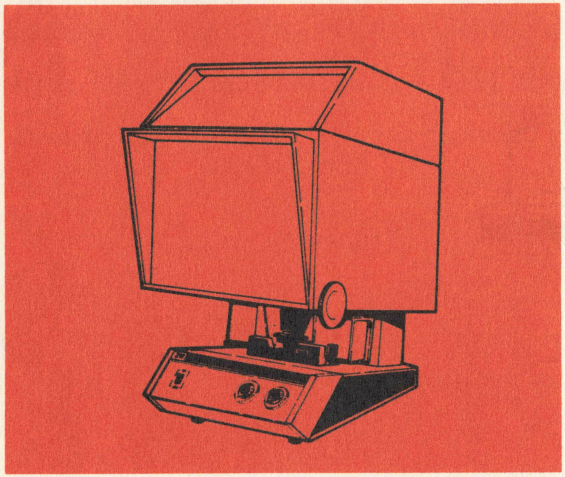
The "500" Reader-Printer provides a fast, simple method of viewing microfilm records . . . and making a permanent copy in seconds. Operation is easy; however, we ask that before using your machine you first take a break -- about fifteen minutes -- and read this manual carefully.

The "500" Reader-Printer is as automatic as is possible for a machine of this type, and thus a skilled microfilm technician is not required to operate it. But the Reader-Printer, like any piece of valuable equipment, should be given proper care and attention. The 3M Company suggests that a conscientious person be designated as a "key operator," and that this person be responsible for cleaning and other maintenance procedures outlined in this manual.

style with a purpose

A silhouette of the "500" Reader-Printer and its operator reveals the usefulness of its design. Although you can stand when operating the machine, the most convenient position is to be seated so your eyes are at the same height as the midpoint of the viewing screen. In this position, you have easy access to all operating controls and are not disturbed by overhead light reflections from the viewing screen.





a model for every use...

There are two models of the "500" Reader-Printer; each is designed for a specific use. The machines differ only in their method of handling the microfilm. Both models have the capability of providing a look at the image and producing a Dry-Silver print.

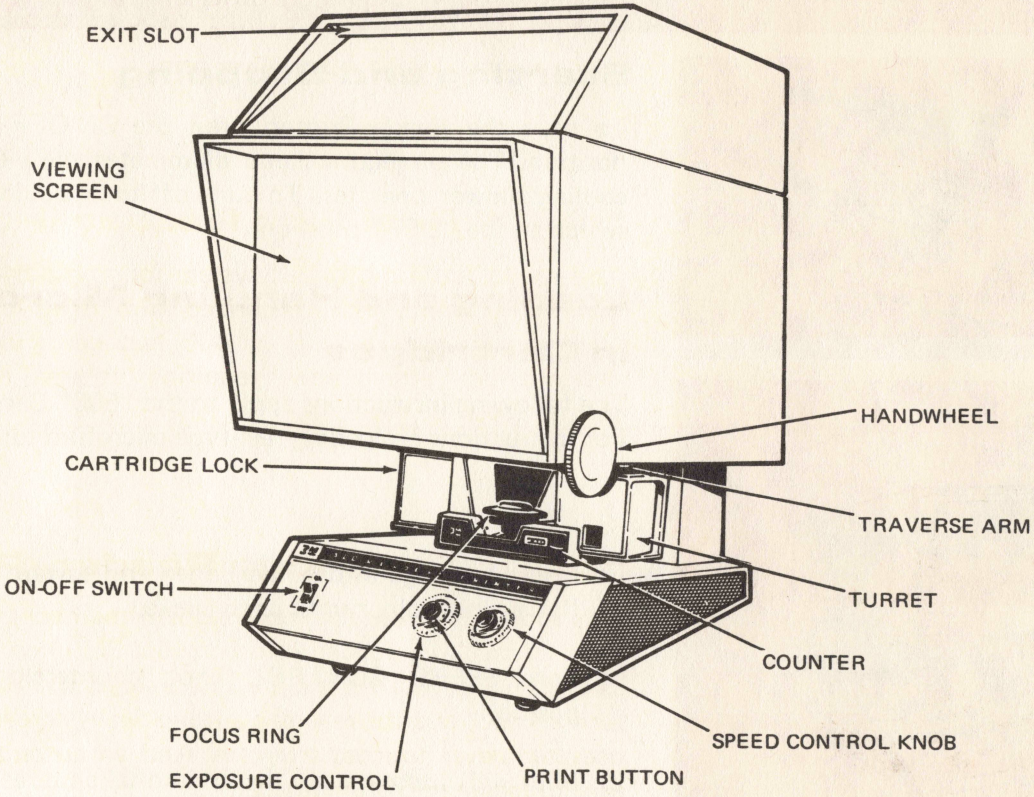
"500" Reel Film Reader-Printer

This model has a motorized system for transporting reel film with the turn of a knob. The motorized film drive provides variable film transport speeds from 10 to 400 feet per minute. This model was designed for applications requiring volume record-finding in the shortest possible time.

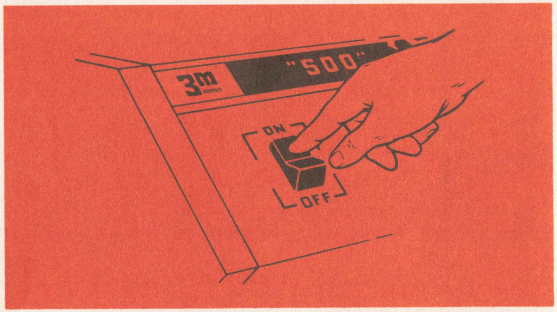
"500" Cartridge Reader-Printer

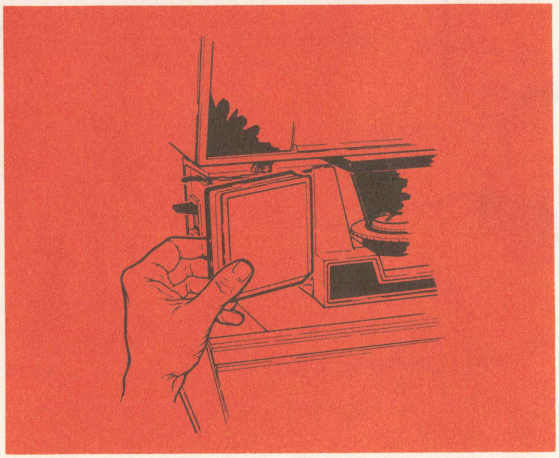
This model provides the most modern method of handling 16mm roll film. Microfilm is loaded into compact 3M microfilm cartridges which can be efficiently filed and are easy to load into the machine . . . simply turn a knob, and the machine automatically threads the microfilm. The operator never touches the film. And an automatic counter makes it easy to locate microfilm images.

operating controls



operating procedures





Starting and Stopping

To start the Reader-Printer, press the ON-OFF switch to the "ON" position. The projection lamp illuminates the viewing screen and the cooling blower operates. To turn off the machine, press the ON-OFF switch to the "OFF" position.

Loading and Handling Microfilm in Cartridges

The following instructions apply to the "500" Cartridge Reader-Printer. For instructions on loading reel-type microfilm turn to page 16.

- ☐ Insert cartridge into holder, open end toward right. Press cartridge flat against holder until latch clicks.
- ☐ Turn SPEED CONTROL knob counterclockwise to 8 o'clock position.
- ☐ Film will automatically thread into take-up reel.

TRANSPORTING MICROFILM

A COUNTER allows the images on the microfilm to be indexed in categories, or groups. For example: A cartridge of microfilm may contain correspondence which is indexed by the month. January correspondence could have a COUNTER reading of 50, February's begins at 85, March's at 105, and so on.

To locate a specific group of microfilm images, simply turn the SPEED CONTROL knob counterclockwise; the farther the knob is turned, the faster the film is transported. Leave the knob in this position until the proper index number appears on the COUNTER, then return it to the center position.

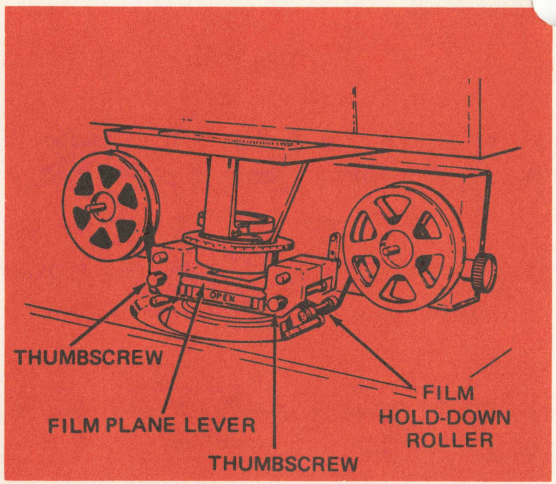
When a cartridge is removed, the COUNTER reading automatically returns to 0000. However, the COUNTER can be indexed back to 0000 at any time simply by pressing the small white button located adjacent to the window.

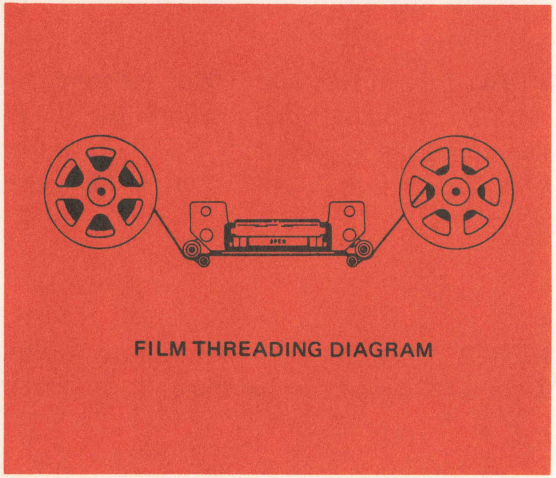
SCANNING AND VIEWING MICROFILM

To scan the cartridge of microfilm in search of a specific frame, turn the HANDWHEEL at the right side of the machine or set SPEED CONTROL for slow speed. After locating the correct frame, use the HANDWHEEL to center the image inside the scribed lines on the VIEWING SCREEN. If the image is not right-side up on the VIEWING SCREEN, turn the TURRET as necessary. To scan the film from top to bottom, move the TRAVERSE arms in or out. To bring the image into sharp focus, rotate the FOCUS RING.

REMOVING MICROFILM CARTRIDGE

To remove the microfilm cartridge from the machine, turn the SPEED CONTROL knob clockwise until all microfilm and leader is wound back into the cartridge. Then, push back the CARTRIDGE LOCK and remove the cartridge from the holder.





FILM THREADING DIAGRAM

Loading and Handling Reel Microfilm

The following paragraphs apply to "500" Reel Film Reader-Printers.

LOADING MICROFILM REEL INTO MACHINE

- ☐ Lift FILM PLANE LEVER to OPEN position.
- ☐ Position film hold-down assembly for film size to be loaded. To load 16 mm microfilm, push assembly in until it latches in rear detent (you feel this). To load 35 mm microfilm, pull assembly out until it latches in forward detent -- pins supporting film hold-down assembly will be nearly flush with front of assembly.
- ☐ Chrome plated FILM HOLD-DOWN ROLLERS must be down, nearly touching cabinet. Lower rollers by loosening two knurled thumbscrews located at front of film hold-down assembly, and pivoting them down. Don't let them drop. Then, tighten thumbscrews.
- ☐ Place film reel on left-hand spindle. Place empty reel on right-hand spindle, and thread microfilm as shown in threading diagram.
- ☐ Advance microfilm by turning HANDWHEEL or SPEED CONTROL knob.

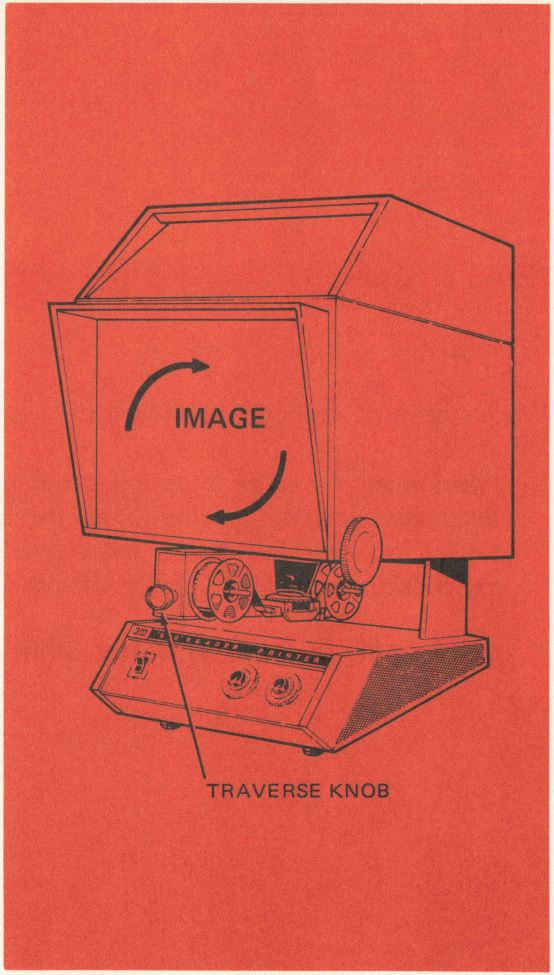
SCANNING AND VIEWING MICROFILM

Before transporting the microfilm, scanning images, or positioning images with the TRAVERSE KNOBS, make certain the FILM PLANE LEVER is in the OPEN position. This prevents scratching the film.

- ☐ To scan microfilm in search of a specific frame, turn HANDWHEEL or set SPEED CONTROL for slow speed.
- ☐ After locating correct frame, use HANDWHEEL to center image inside scribed lines on VIEWING SCREEN. To move image up or down on VIEWING SCREEN, turn either TRAVERSE KNOB. Image may be turned on screen by rotating TURRET, which has 360 degrees travel.
- ☐ Depress FILM PLANE LEVER to CLOSED position and bring image into sharp focus by rotating FOCUS RING.

INSERTING APERTURE CARDS

- ☐ Loosen knurled thumbscrew located at front of film hold-down assembly, lift chrome plated FILM HOLD-DOWN ROLLERS and latch them in raised position by tightening knurled thumbscrews.
- ☐ Lift FILM PLANE LEVER to OPEN position.
- ☐ Insert aperture card between glass flats and depress FILM PLANE LEVER to CLOSED position.



Making a Print

When a print of a microfilm frame is desired, first center and focus the image on the VIEWING SCREEN. Then . . .

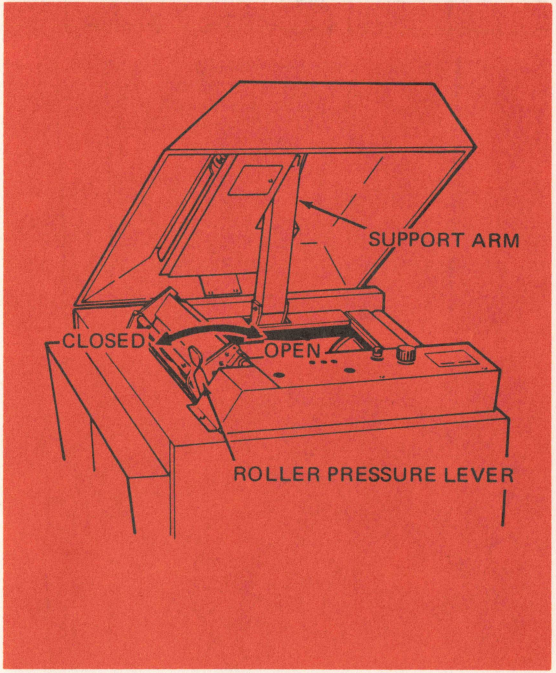
- ☐ When making a print of a microfilm frame having average density, turn EXPOSURE knob to a setting of 3 or 4. Make certain knob rests in a "detent" and pointer does not lie between numbers. Low density microfilm requires a setting of 1 or 2; high density microfilm a setting of 5 or 6. The best settings to use will be learned through experience. Remember: Lower settings give light prints; higher settings give dark prints.

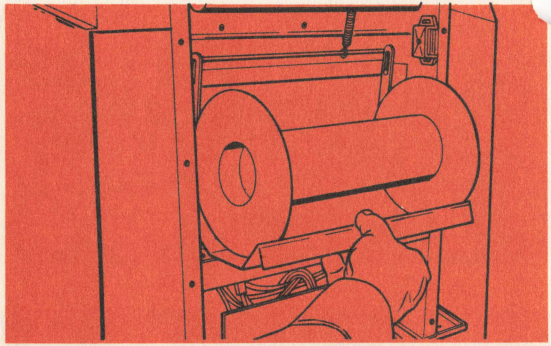
- ☐ Momentarily press PRINT button. Print will automatically emerge from EXIT SLOT.

loading copy paper

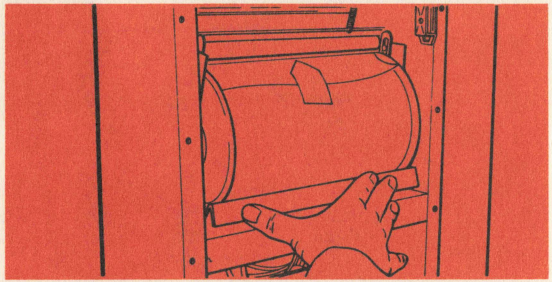
If the PRINT button is inoperative (VIEWING SCREEN illuminated) the supply of copy paper is exhausted. To load a new roll of copy paper . . .

- ☐ Open top cover at right-hand side of machine and raise until latched in vertical position.
- ☐ Push roller pressure lever toward back of machine to open paper drive rollers. Remove paper remnant.

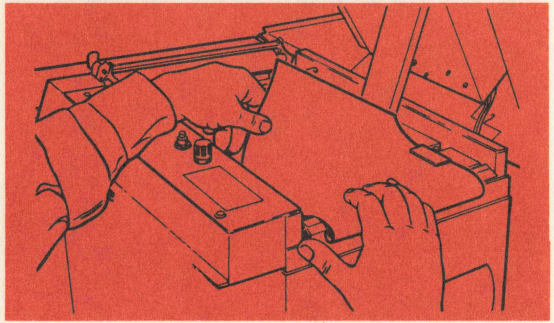




- ☐ Open back cover, slide out paper tray and remove depleted roll.

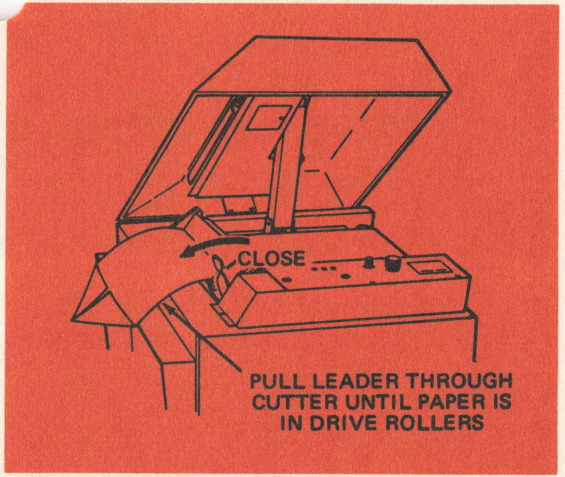


- ☐ Remove new roll from bag and place roll on paper tray. Slide in paper tray as far as it will go.



- ☐ Pull about a foot of leader from roll and close back cover. Fold leading edge of leader to form a point, and insert leading edge under interlock switch cover.

- ☐ Crease folded edges of leader and bend tip slightly upward.
- ☐ Press PRINT button to open cutter blades. Machine will stop in exposure cycle until cover is closed.
- ☐ Position leader on support rails and slip pointed, leading edge between drive rollers and cutter.
- ☐ Pull leader through cutter until paper is in drive rollers. Align edges of paper with edges of rubber roller and pull roller pressure lever toward front of machine to close drive rollers. Make certain edges of paper are on support rails.

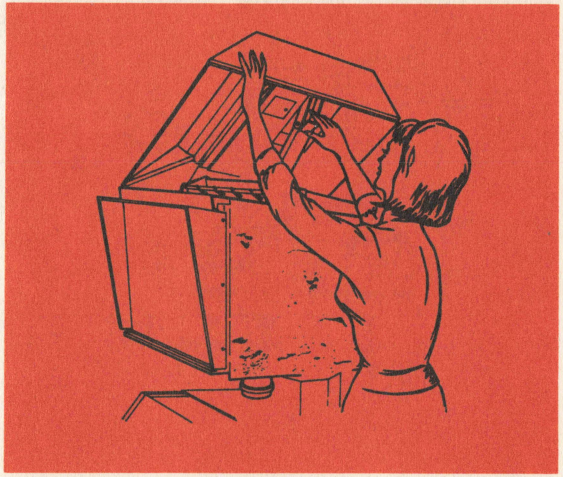


PULL LEADER THROUGH CUTTER UNTIL PAPER IS IN DRIVE ROLLERS

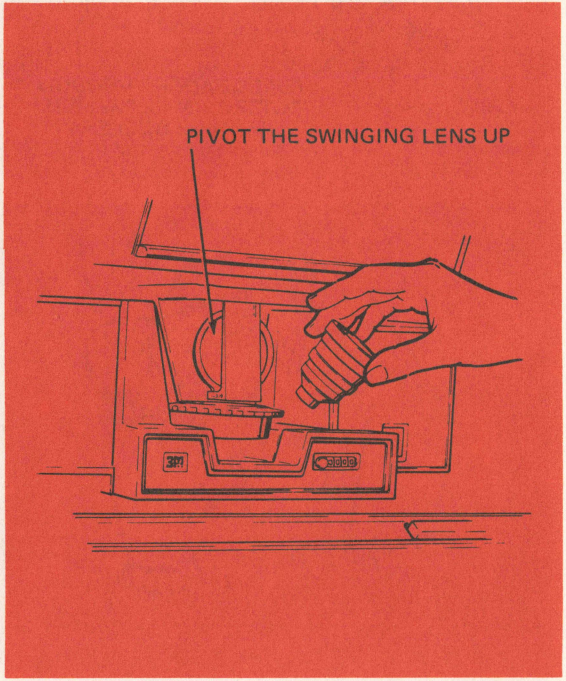
warning

Close top cover by supporting cover with left hand and releasing support arm with right hand.

- ☐ When cover is closed, paper will drive between top cover and cabinet. Remove paper.
- ☐ Make two prints to eliminate paper exposed during loading.



interchanging enlarging lenses



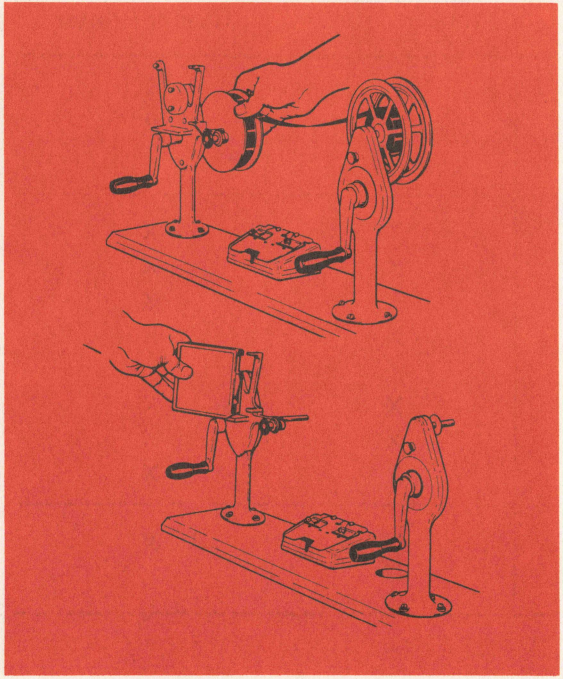
A wide selection of enlarging lenses is available for use in the "500" Reader-Printer. These lenses are divided into three major groups, or "families" -- high, low and medium magnification or focal length. Lenses within a magnification group may be interchanged by pivoting the swinging lens up, lifting out the existing lens, and replacing it with a lens having the desired magnification. Table 1 cross-references lenses by focal length and magnification, and lists modifications required on the machine when using lenses in the high or low magnification groups. Modifications to machines for high and low magnification ranges are normally made by your customer service representative.

TABLE 1

	LENS SPECIFICATIONS		MACHINE MODIFICATIONS REQUIRED	MACHINE USAGE	
	Focal Length	Magnification		Cartridge Reader-Printer	Reel Film Reader-Printer
LOW MAGNIFICATION LENSES	58 mm	6.59X	Low Mag Kit		X
	50 mm	8.05X	Low Mag Kit		X
	40 mm	10.60X	Low Mag Kit		X
STANDARD MAGNIFICATION LENSES	36 mm	12.05X	None		X
	30 mm	14.88X	None	X	X
		15.7X	None	X	X
	25 mm	18.25X	None	X	X
	22.24 mm	20.78X	None	X	X
	20.00 mm	23X	None	X	X
		25X	None	X	X
HIGH MAGNIFICATION LENSES	16.3 mm	29X	High Mag Kit	X	X
	13.7 mm	35X	High Mag Kit		X *

* 35X Clamp Kit required in reel-type machines.

loading 16mm microfilm into 3m cartridges



The 3M Microfilm Cartridge Loader provides a simple, convenient means of loading up to 100 feet of standard 16 mm microfilm into 3M Microfilm Cartridges. Plastic leader and trailer strips supplied with each cartridge must be spliced to the microfilm before loading. These instructions contain step-by-step directions for the splicing and loading procedures.

- ☐ Microfilm received from processor is usually wound with frame numbers in ascending order -- first image made is on outside of roll. Place empty reel on right-hand spindle and place film reel on rear, left-hand spindle. Rewind microfilm to right-hand reel; this places images in descending order.

- ☐ Place empty cartridge, open end at right, on left-hand rewind unit. Press cartridge flat against rewind until it snaps in place.

- ☐ Pull leader strip out of cartridge and remove tape which attaches leader to trailer strip. Remove leader; leave trailer strip attached to cartridge.

- ☐ Place microfilm reel on spindle of right-hand rewind until (if microfilm was just rewound to descending order, microfilm reel will already be in position). Silver film should be wound on reel with emulsion (dull) side out, and frame of last document microfilmed at loose end of film. First generation diazo film should be wound similarly except emulsion (dye) surface should face toward center of reel.

- ☐ Lift left-hand blade of splicer unit, insert film into channel of right-hand blade, slip hold-down spring over film, and lower left-hand blade to trim end of film square.

note

Splicer unit will not cut mylar-base films.

- ☐ Place trailer strip in channel of left-hand blade so leading end butts evenly against end of film. Place hold-down spring over trailer.

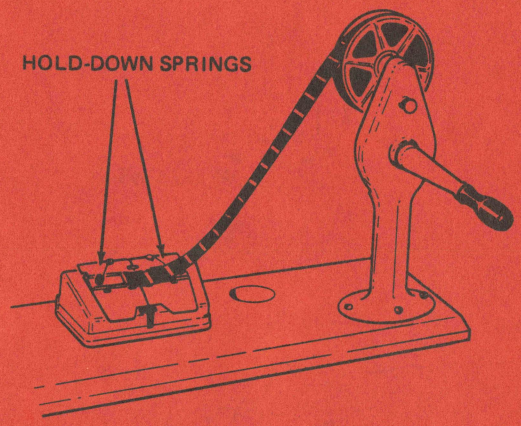
note

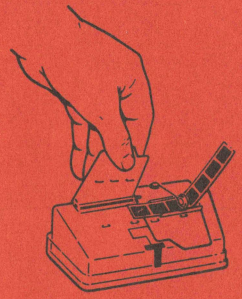
Do not trim ends of leader or trailer strips.

- ☐ Place splicing tab over junction of film and trailer, hold down left-hand "wing" of tab, and pull away right-hand protective backing. Place finger on tape over film and pull away left-hand protective backing. Press tape firmly to form a lasting splice.

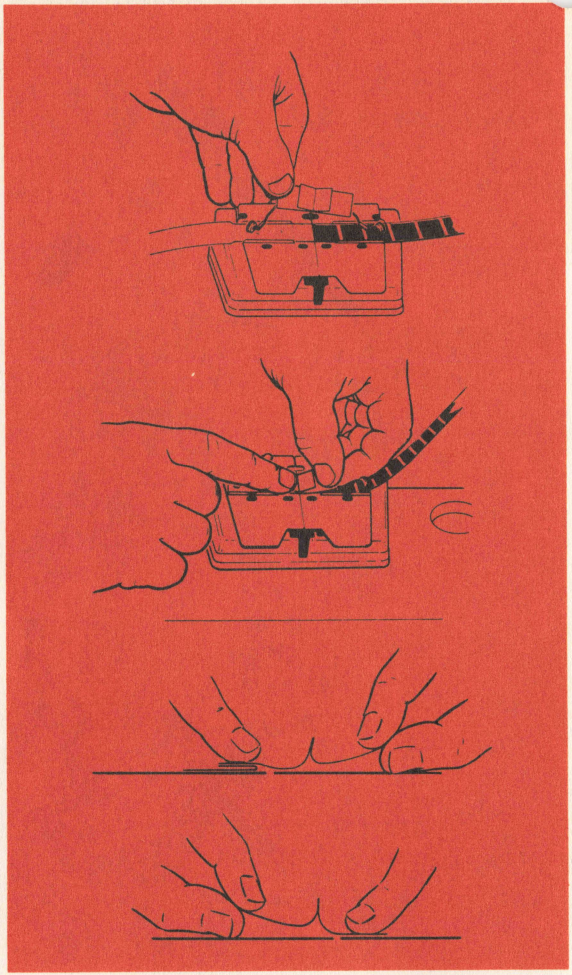
note

See next page for illustration showing application of splicing tab.





TRIM FILM SQUARE



- ☐ Release film and trailer from splicer unit, turn upside down, and apply a splicing tab to reverse side. Make certain tape does not extend past edge of film or trailer.
- ☐ Wind trailer and film into cartridge, leaving about 18 inches of film extend from cartridge.
- ☐ Place free end of film in channel of left-hand blade of splicer unit, and use right-hand blade to trim end square. If end is not square, film may not track properly in "500" Cartridge Reader-Printer. Attach narrow end of leader strip to end of film with two splicer tabs, using same procedure as for film-to-trailer splice.
- ☐ Wind film and leader into cartridge.

attachments available for "500" reader-printers

Low and High Magnification Condensing Systems

Reel Film "500" Reader-Printers provide 6.59X, 8.05X, 10.60X, 29X and 35X magnifications only if the appropriate condensing lens system is installed in the machine. Once a high or low magnification condensing system is installed, only lenses in that magnification group may be used interchangeably.

Diazo Film Platen

When diazo microfilm is used in a "500" Cartridge Reader-Printer, the image or print will not have as high a resolution characteristic as a print or image from silver-type microfilm. For most applications, however, the image is sufficiently sharp. For applications where high resolution is important, the standard film platen may be removed and a special diazo film platen installed.

Odometer Mirror Kit

Some applications require that the turret in the "500" Cartridge Reader-Printer be rotated 90 degrees clockwise during operation. The Odometer Mirror Kit allows the operator to view the counter when the turret is in this position.

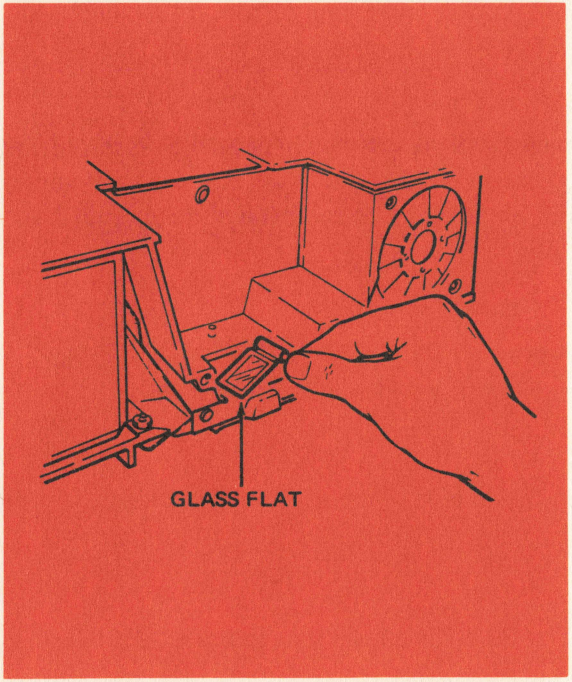
Odometer Kit

Reel Film "500's" are not equipped with counters. The Odometer Kit can be added to any of these machines and will indicate the amount of film (16 mm) that is transported.

29X Kit

The "500" Cartridge Reader-Printer normally will not accept a 29X lens. The 29X Kit allows you to use a 29X lens in a cartridge machine.

cleaning



Cleanliness is of prime importance in assuring trouble-free machine operation. At least once a week, perform the following cleaning procedures:

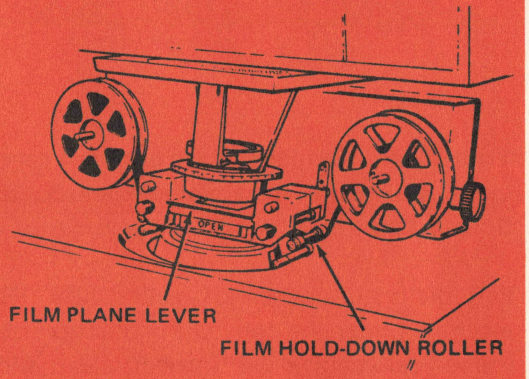
Glass Platen (Cartridge Machine Only)

- ☐ Lift lens from holder.
- ☐ Pull out front, lower cover of turret.
- ☐ Lift up pin handle and remove glass platen.
- ☐ Carefully clean glass flat surfaces and underside ledges with tissue.
- ☐ Replace glass flat assembly by first letting left-hand end drop into platen area, then seating platen.
- ☐ Replace turret cover and lens.

Film Plane Glass Flat

(Reel Film Machines Only)

- ☐ Lift FILM PLANE LEVER to OPEN position, and raise chrome plated FILM HOLD-DOWN ROLLERS.
- ☐ Pull off film hold-down assembly.
- ☐ Clean glass flats in film hold-down assembly and on machine with lens tissue.
- ☐ Replace film hold-down assembly.



the importance of service

Your "500" Reader-Printer has been carefully designed and manufactured to provide many years of efficient service. To realize its maximum capabilities and assure your absolute satisfaction, treat the machine with respect and provide it with the same care you would similar types of office equipment.

Periodic maintenance of your "500" Reader-Printer can be economically and effectively provided by putting the machine under the constant protection of a 3M GUARANTEED MAINTENANCE AGREEMENT. Under the GMA plan, trained servicemen will inspect, clean and adjust your machine every 60 days, instruct you in its proper operation, and keep you informed of other new products developed by the 3M Microfilm Products Division.

Ask your dealer or sales representative for details of the GUARANTEED MAINTENANCE AGREEMENT. The cost is low and more than offset by the benefits.

maintenance

The "500" Reader-Printer, like other office and systems machines, requires only a normal amount of maintenance. However, the operator should be sensitive to the machine's operating characteristics, be able to recognize a malfunction or symptom of improper operation and take corrective action. The following pages describe some of the more common problems that may arise, and explain how to solve them. Usually the trouble can be corrected in minutes without the use of tools or test instruments. Of course, complex malfunctions require the expert attention of a trained serviceman. If machine difficulties arise, you will save time and money by following this procedure:

- ☐ Determine what the problem is and, by using this manual, try to solve it.
- ☐ If you are unable to arrive at a solution, call your service representative, explain the situation, and ask for his advice -- this saves time and costs you nothing.
- ☐ If the machine continues to cause trouble, ask your serviceman to pay you a visit.

malfunctions and remedies

The following paragraphs give step-by-step procedures for restoring the "500" Reader-Printer to operation when troubles occur.

Malfunction	Remedy
Machine does not start.	1. Power cord not plugged into electrical outlet. 2. Fuse blown or circuit breaker tripped in power distribution box in building. 3. Ten-ampere line fuse blown. Unplug machine and replace. Fuses available from serviceman.
Copy is black.	Copy paper pre-exposed.
Image out of focus from top to bottom (Cartridge machine only).	1. Make certain underside of platen is clean. 2. Make certain splice between leader and film is square. Faulty splice may cause film to mistrack and dislodge platen.

Malfunction	Remedy
Motorized film transport system doesn't work	Machine circuit breaker tripped. Wait about one minute, open top cover, then press red button on fuse panel.
Image not in focus.	1. Turn focus ring. Make certain Film Plane Lever is in CLOSED position. 2. Film platen left out.
Copy lacks contrast.	1. Microfilm image too dense, lacks contrast. 2. Exposure setting too low. Advance setting of EXPOSURE knob.
Copy is blank	1. EXPOSURE knob not set in a "detent"; pointer in between numbers. 2. Lamp burned out.
Machine stops in exposure cycle.	Top cover not securely in position.
Print button inoperative.	1. Machine out of paper. 2. Paper not tight - interlock switch open. Reload paper. 3. Machine not up to operating temperature. Wait one minute before making first print.

specifications

Shipping Specifications:

Carton Height	39 inches
Carton Width	29-1/2 inches
Carton Depth	34-1/2 inches
Shipping Weight	170 pounds

Machine Specifications (nominal):

Height	31-1/2 inches
Width	20-1/4 inches
Depth	25-1/4 inches
Weight	136 pounds

Electrical Requirements:

	Universal Models	Standard Models
Voltage	90-250 volts	100-130 volts
Current	10 amps at 115V	10 amps at 115V
Frequency	50/60 Hz	50/60 Hz

Viewing Screen Size . . . . . 12 by 16 inches

Print Size . . . . . 8-1/2 by 12-5/8 inches

Print Image Size . . . . . 8 by 10-3/4 inches

Print Rate . . . . . six prints per minute

Microfilm Accommodated:

Cartridge Reader-Printers . . . 16 mm loaded in 3M Cartridge

Reel Film Reader-Printers . . 16 and 35 mm reels, jackets, aperture cards, sheet film

Magnifications Available (at print plane):

Cartridge Reader-Printers 14.88X, 18.25X, 20.78X, 23X, 29X

Reel Film Reader-Printers 6.59X, 8.05X, 10.60X, 12.05X, 14.88X, 15.7X, 18.25X, 20.78X, 23X, 25X, 29X, 35X

Supplies Required . . . . 3M Brand Dry-Silver Paper

3M Microfilm Products Division
MINNESOTA MINING & MANUFACTURING CO.

78-6969-2922-9